What is claimed is:

1. A composite structure, comprising:
a substrate; and
a coating adjoined to the substrate, wherein the coating comprises tantalum disilicide and borosilicate glass.

2. The composite structure of claim 1, wherein the coating further comprises molybdenum disilicide.

3. The composite structure of claim 1, wherein the coating further comprises a processing aid.

4. The composite structure of claim 3, wherein the processing aid comprises silicon hexaboride.

5. The composite structure of claim 1, wherein a surface layer of the coating comprises approximately 5% to 70% tantalum disilicide, approximately 0% to 30% molybdenum disilicide and approximately 10% to 95% borosilicate glass.

6. The composite structure of claim 1, wherein a surface layer of the coating comprises approximately 10% to 65% tantalum disilicide, approximately 5% to 30% molybdenum disilicide and approximately 20% to 45% borosilicate glass.

7. The composite structure of claim 5, wherein a sub-layer of the coating comprises approximately 20% to 60% molybdenum disilicide and approximately 40% to 80% borosilicate glass.

8. The composite structure of claim 7, wherein the sub-layer impregnates a surface of the substrate.

9. The composite structure of claim 8, wherein the sub-layer impregnates the surface of the substrate to a depth of approximately 0.1 inches.

10. The composite structure of claim 1, wherein the substrate is selected from the group consisting of a fibrous and open pore silica, silicon carbide, aluminosilicate, silicon oxycarbide and carbon substrates.

11. The composite structure of claim 1, wherein components of the coating have a particle size less than about 5 _m.

12. The composite structure of claim 1, wherein components of the coating have a particle size distribution having a maximum of approximately 5 _m and a mode of approximately 1 _m.

13. The composite structure of claim 1, wherein the coating further comprises:
a sub-layer impregnating the substrate, wherein the sub-layer comprises approximately 55% molybdenum disilicide, 2.5% silicon hexaboride and 42.5% borosilicate glass; and
one or more second layers applied over the sub-layer, wherein each of the second layers comprises approximately 35% tantalum disilicide, 20% molybdenum disilicide, 2.5% silicon hexaboride and 52.5% borosilicate glass.

14. The composite structure of claim 13, wherein the borosilicate glass comprises approximately 90% to 99% silicon dioxide and 1% to 10% boron oxide.

15. The composite structure of claim 13, wherein the borosilicate glass comprises approximately 94.25% silicon dioxide and 5.75% boron oxide.

16. The composite structure of claim 13, wherein the sub-layer comprises approximately 40% of the coating.

17. The composite structure of claim 16, wherein the one or more second layers comprise approximately 60% of the coating.

18. The composite structure of claim 1, wherein the coating further comprises:
a sub-layer applied to the substrate, wherein the sub-layer comprises approximately 20% molybdenum disilicide, 2.5% silicon hexaboride and 77.5% borosilicate glass; and
one or more second layers applied over the sub-layer, wherein each of the second layers comprises approximately 60% tantalum disilicide, 15% molybdenum disilicide, 2.5% silicon hexaboride and 22.5% borosilicate glass.

19. The composite structure of claim 18, wherein the sub-layer comprises approximately 40% of the coating.

20. The composite structure of claim 19, wherein at least a portion of the sub-layer impregnates a surface of the substrate.

21. The composite structure of claim 1, wherein the coating further comprises approximately 50% tantalum disilicide, 5% silicon hexaboride and 45% borosilicate glass.

22. The composite structure of claim 1, wherein the coating further comprises:
a sub-layer impregnating the substrate, wherein the sub-layer comprises approximately 55% molybdenum disilicide, 2.5% silicon hexaboride and 42.5% borosilicate glass; and
one or more second layers applied over the sub-layer, wherein each of the second layer comprises approximately 45% tantalum disilicide, 10% molybdenum disilicide, 2.5% silicon hexaboride and 42.5% borosilicate glass.

23. The composite structure of claim 22, wherein the sub-layer comprises approximately 40% of the coating.

24. The composite structure of claim 1, wherein the coating further comprises:
a sub-layer impregnating the substrate, wherein the sub-layer comprises approximately 55% molybdenum disilicide, 2.5% silicon hexaboride and 42.5% borosilicate glass; and
one or more second layers applied over the sub-layer, wherein each of the second layers comprises approximately 40% tantalum disilicide, 15% molybdenum disilicide, 2.5% silicon hexaboride and 42.5% borosilicate glass.

25. The composite structure of claim 24, wherein the sub-layer comprises approximately 40% of the coating.

26. The composite structure of claim 1, wherein the coating further comprises:
a sub-layer applied to the substrate, wherein the sub-layer comprises approximately 20% molybdenum disilicide, 2.5% silicon hexaboride and 77.5% borosilicate glass; and
one or more second layers applied over the sub-layer, wherein each of the second layers comprises approximately 50% tantalum disilicide, 20% molybdenum disilicide, 2.5% silicon hexaboride and 27.5% borosilicate glass.

27. The composite structure of claim 26, wherein the sub-layer comprises approximately 40% of the coating.

28. The composite structure of claim 27, wherein at least a portion of the sub-layer impregnates a surface of the substrate.

29. The composite structure of claim 1, wherein the coating further comprises approximately 10% tantalum disilicide, 30% molybdenum disilicide, 2.5% silicon hexaboride and 57.5% borosilicate glass.

30. A composite structure, comprising:
a porous substrate selected from the group consisting of aluminosilicates and silicon/carbon compositions;

a sub-layer applied to the porous substrate, wherein the sub-layer comprises molybdenum disilicide, silicon hexaboride and borosilicate glass and wherein the sub-layer impregnates a surface of the porous substrate; and

one or more second layers applied to the sub-layer, wherein each of the second layers comprises tantalum disilicide, molybdenum disilicide, silicon hexaboride and borosilicate glass.

31. The composite structure of claim 30, wherein the structure is sintered at between approximately 2225°F and 2400°F.

32. The composite structure of claim 30, wherein the structure is sintered at approximately 2225°F for approximately 90 minutes.

33. The composite structure of claim 30, wherein the structure is sintered at approximately 2400°F for approximately 10 minutes.

34. The composite structure of claim 30, wherein the tantalum disilicide, molybdenum disilicide, silicon hexaboride and borosilicate glass of the sub-layer and second layer are each milled to have a maximum particle size of approximately 5 _m.

35. The composite structure of claim 34, wherein the tantalum disilicide, molybdenum disilicide, silicon hexaboride and borosilicate glass of the sub-layer and one or more second layers are each milled to have a particle size distribution having a mode of approximately 1 _m.

36. The composite structure of claim 30, wherein the sub-layer comprises approximately 20% to 60% molybdenum disilicide, 1% to 5% silicon hexaboride and 40% to 80% borosilicate glass.

37. The composite structure of claim 30, wherein at least one of the second layers comprises approximately 10% to 65% tantalum disilicide, 5% to 30% molybdenum disilicide, 1% to 5% silicon hexaboride and 20% to 45% borosilicate glass.

38. A composite structure, comprising:
a porous substrate selected from the group consisting of aluminosilicates and silicon/carbon compositions; and
a coating applied to the substrate, wherein the coating comprises tantalum disilicide, silicon hexaboride and borosilicate glass.

39. The composite structure of claim 38, wherein at least a portion of the coating impregnates a surface of the porous substrate.

40. The composite structure of claim 39, wherein the coating impregnates the surface of the porous substrate to a depth of approximately 0.1 inches.

41. The composite structure of claim 38, wherein the structure is sintered at between approximately 2225°F and 2400°F.

42. The composite structure of claim 38, wherein the structure is sintered at approximately 2225°F for approximately 90 minutes.

43. The composite structure of claim 38, wherein the structure is sintered at approximately 2400°F for approximately 10 minutes.

44. The composite structure of claim 38, wherein the tantalum disilicide, silicon hexaboride and borosilicate glass of the coating are each milled to have a maximum particle size of approximately 5 _m.

45. The composite structure of claim 44, wherein the tantalum disilicide, silicon hexaboride and borosilicate glass of the coating are each milled to have a particle size distribution having a mode of approximately 1 _m.

46. The composite structure of claim 38, wherein the coating comprises approximately 10% to 65% tantalum disilicide, 0% to 30% molybdenum disilicide, 1% to 5% silicon hexaboride and 20% to 60% borosilicate glass.